New Zealand Marine Habitat Mapping

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Key Message

New Zealand's Marine Protected Area policy seeks to protect marine biodiversity by protecting representative examples of a full range of marine habitats and ecosystems, including those that are internationally or nationally rare or distinctive. To achieve this, it is essential to have accurate biophysical habitat maps against which levels of protection can be assessed.

There is a need for coordination between organisations and research institutes to highlight lesser-known existing data that can be used for habitat mapping and coordinate future data collection in key areas to increase accuracy and coverage of marine habitat mapping.

NATIONAL MARINE HABITAT CLASSIFICATIONS

National Coastal Marine Habitat Classification, 2011[1]

The current national coastal marine habitat classification covers broad scale habitats defined by the Coastal Classification and Mapping Scheme using data consistently available at a national scale. This provides an approximate basis to determine the extent to which habitats are protected by MPAs and other forms of marine managemment and gaps in the national MPA network.

It maps predominately physical habitats derived from broad categoaries of environmental drivers – depth, substratum and exposure and the actions of biogenic habitat forming organisms.

It does not aim to assess outstanding, distinctive, rare, nationally or internationally important habitats or ecosystems or finer scale species associations and ecosystem processes.The classifcation is considered too broad scale for marine spatial planning at local scales.

More detailed mapping of habitats have been ooccuring in smaller regions, as outlined in this poster, to help supplement the national dataset for planning at regional scales.

Coastal Marine Habitats in the 2011 classification *Source: DOC and Mfish, 2011*

New Zealand Marine Habitat ClassifcationScheme (NZMHCS), 2013[2]

This is being developed by the Department of Conservation to extend and improve the marine habitat classfications.The NZMHCS more consistently aligns with international classification schemes to facilitate accurate biodiversity inventories.

The scheme is a hierarchical classification based on four sections; location, physical characteristics, abiotic habitats and biotic habitats, with finer levels of detail within in each section.

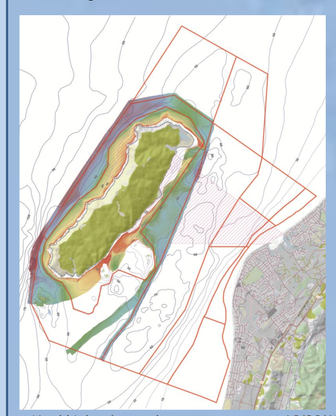
National broad-scale and localised finer-scale habitat maps can be created using an appropriate combination of sections and levels.

NZMHCS Section	Section Level
1) Location	Level 1: Oceanic Area (*Deepwater* or *Coastal*) Level 2: Biogeographic Regions (14 MPA defined regions, MEC) Level 3: Biogeographic Subregions (11 subregions from Shears et al., 2008) Level 4: DOC Conservancy (11 current) Level 5: Region (To be identified) Level 6: Location (To be identified)
2) Physical Characteristics	Level 1: Environment Type (*Coastal Estuarine, Coastal Marine, Deepwater Pelagic, Deepwater Benthic*) Level 2: Depth (*Intertidal, Subtidal,* Pelagic zones, Continental slope zones) Level 3: Subtidal Depth (*Shallow, Deep*) Level 4: Exposure (*Low, Medium, High, High current*)
3) Abiotic Habitat	Level 1: Broad Habitat (*Sediment, Rocky reef, Mixed, Artificial, Unknown*) Level 2: Main Habitats (finer classification of Level 1) Level 3: Substratum Texture (finer classification of Level 2)
4) Biotic Habitat	Level 1: Broad Biotope (*Macroalgae producing canopy, Macroalgae not producing a canopy, Urchin barren, Biogenic reef, Mangrove, Salt marsh, Seagrass beds*) Level 2: Biotope Complex (dominant species/morphology) Level 3: Biotope (finer taxa or community identification) Level 4: Sub-biotope (identifying the community by species)

Overview of NZMHCS. *Source: Dohner 2013*

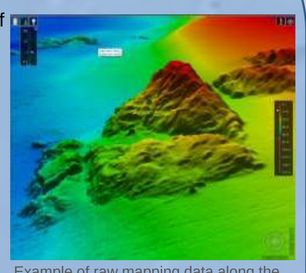
Multibeam Seafloor Mapping of Kapiti Island's Submarine Landscape

The project is a partnership between NIWA, Victoria University of Wellington, DOC and LINZ.



Kapiti Island mapping progress as at 19/06/15. Red lines depict area to be mapped. *Source: NIWA*

A multibeam survey of the area is currently in progress by NIWA, extending over 50km² to a depth of 50m, covering Kapiti Island Marine Reserve and its surroundings. The high resolution of the multibeam data (sub-metre accuracy) not only provides detailed bathymetry data, but also valuable information on water masses, substrates and habitat types.



Example of raw mapping data along the West Coast of Kapiti. The rock depicted is 100m long and 30m high. *Source: NIWA*

Data outputs will feed into more detailed and accurate bathymetry, habitat and biotope mapping of the Kapiti Island Marine Reserve and adjacent marine areas. This will enable more effective management planning of this ecologically important area.

Data will also be used by LINZ to update nautical charts for the next release.

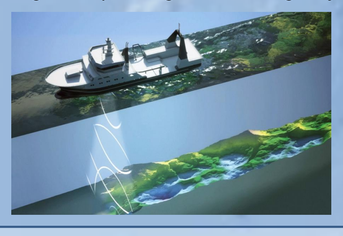
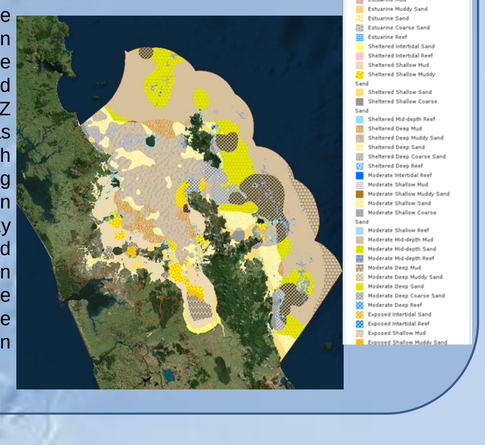


Illustration of multibeam echo-sounder mapping, using a fan of acoustic beams providing 100 percent coverage of the seabed.*Source: NIWA*

Hauraki Gulf MPA Policy Habitat Classification 2014[4,7]

Utilised to inform SeaChange, the comprehensive marine spatial planning programme in the Hauraki Gulf, Marine Park.

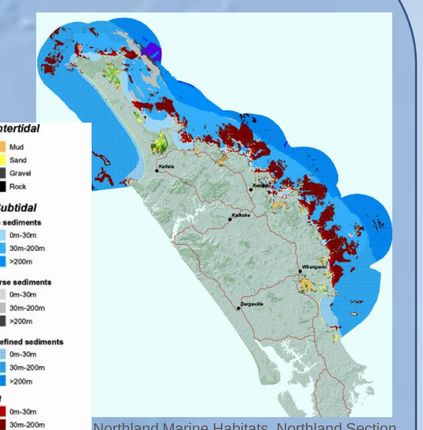
Estuarine and marine habitats occurring within the Hauraki Gulf Marine Park have been defined according to the NZ Marine Protected Areas Policy guidelines (MFish & DOC 2008), using updated information on the distribution of rocky reefs, soft sediments and estuarine vegetation developed for the Hauraki Gulf Marine Spatial Plan (Jackson 2014).



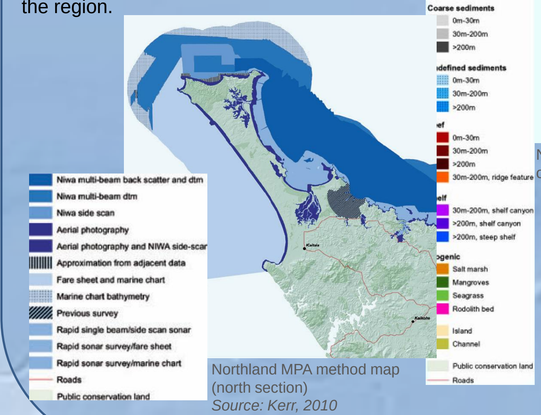
Northland Marine Habitat Map[5]

A comprehensive map of marine habitats and estuaries covering the Northland extent of the NorthEast Marine Bioregion (1.34 million ha) was produced by Vince Kerr for DOC in 2010.

A wide range of data sources and formats were combined in GIS to develop a marine habitat map using the MPA policy marine habitat classifications, to support and inform marine protected area planning in the region.



Northland Marine Habitats, Northland Section of the Northeast Bioregion. *Source: Kerr, 2010*

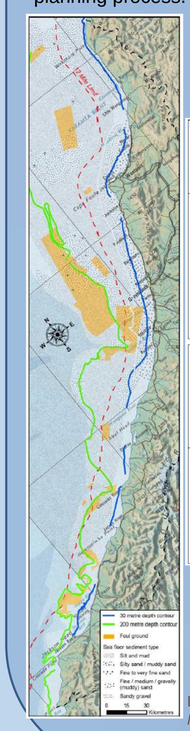


Northland MPA method map (north section) *Source: Kerr, 2010*

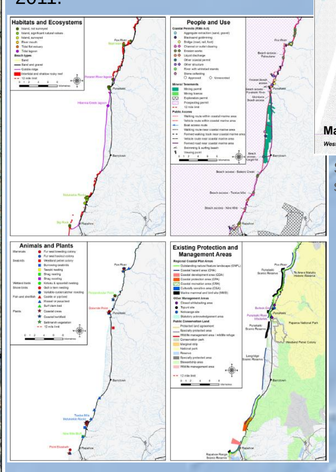
Data were from digitised marine aerial survey photos, marine charts, topomaps, multibeam sidescan and sonar surveys.

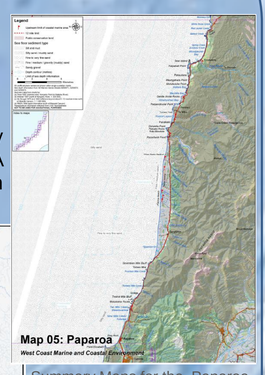
West Coast Marine and Coastal Environment [6]

The West Coast Marine Protection Forum required information on estuarine, coastal and marine environments to inform the marine protected area planning process.



The process was well underway prior to the release of of the MPA Policy Habitat Classification in 2011.





Summary Maps for the Paparoa segment of the West Coast

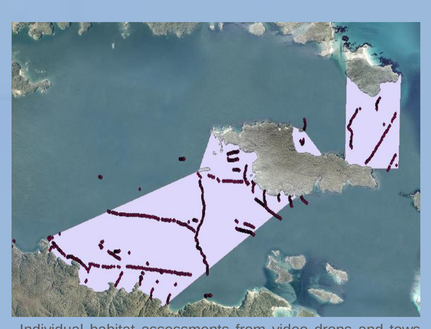
Local maps detailing substrate, depth and exposure were produced for the West Coast using a combination of methods from digtizing historical paper maps to sourcing more recent trawl survey data,

Examples of the maps produced for the forum are shown here, with detailed information of the Paparoa coastline. Fourteen similar segment maps were produced along the West Coast.

Deep nearshore substrate types. *Source: Stevenson 2004, RNZN, Mitchell 1987, Prince 1983a&b, McDougal 1975&1982*

Ulva Island – Te Wharawhara Marine Reserve Habitat Mapping [3]

Underwater video monitoring was undertaken within the Ulva Island marine reserve using drop-camera drifts and video sled tows by DOC's Marine Ecosystems Team in 2014.



Individual habitat assessments from video drops and tows in and around Ulva Island/ Te Wharawhara Marine Reserve, Paterson Inlet, Stewart Island. *Source: Haggitt 2015*

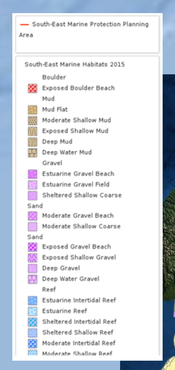
Biotic (above) and abiotic (below) habitats mapped in and around Ulva Island/ Te Wharawhara Marine Reserve, Paterson Inlet, Stewart Island. *Source: Haggitt 2015*

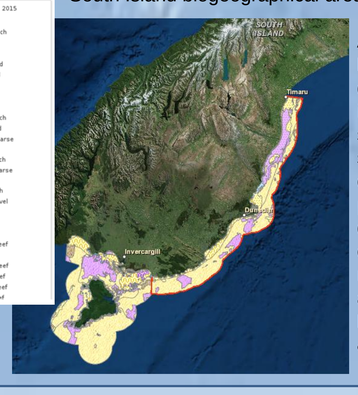
Combining this footage with historicla habitat maps (Hare 1992) and aerial imagery, biotic and abiotic habitats have been constructed by eCoast, using the NZ Marine Habitat Classification Scheme (Dohner 2013).

This methodology is also being applied to analyse video footage and data from similar work in Hahei and Long Island Marine Reserves.

South East Marine MPA Coastal Habitat Classification[8]

This dataset was created for use by the South-East Marine Protection Planning Forum (MPPF), tasked with proposing areas of marine protection within a section of the Southern South Island biogeographical area.





A variety of source data - LINZ topo50 coastlines, digitising aerial imagery of intertidal areas, multibeam surveys, DEMs. depth soundings, and navigational charts - was analysed to produce the input datasets of depth, substrate and exposure. These were merged and classified according to the NZ MPAPolicy guidelines (MFish & DOC 2008),

References:

1. Department of Conservation. 2011. Coastal marine habitats and marine protected areas in the New Zealand Territorial Sea: a broad scale gap analysis. Department of Conservation and Ministry of Fisheries. Wellington, New Zealand
2. Dohner, M. (2013) Proposal for a new Zealand Marine Habitat Classification Scheme (NZMHCS). Prepared for the Department of Conservation
3. Haggitt, T., 2015. Ulva Island – Te Wharawhara Marine Reserve Habitat Mapping, eCoast Limited, *Draft*
4. Jackson, E.S. 2014. Prioritision of Areas in the Hauraki Gulf Marine Park for Biodiversity Conservation M.Sc. thesis, Marine Science, University of Auckland
5. Kerr, V.C., 2010. Marine Habitat Map of Northland: Mangawhai to Ahipara Vers. 1. Technical Report, Department of Conservation, Northland Conservancy, Whangarei, New Zealand.
6. Neale, D.M., 2007. The West Coast Marine and Coastal Environment. An Initial Report for the West Coast Marine Protection Forum, West Coast Marine Protection Forum, Hokitika, New Zealand
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New Zealand Government

Department of Conservation
Te Papa Atawhai